

WHAT IS CLAIMED IS:

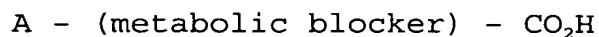
1. A method of reducing or eliminating metabolic caloric content of a food composition comprising an edible fat, said method comprising substituting, for at least a portion of the edible fat of said food composition, a compound that is a fatty acid whose yield energy from beta-oxidation is sufficiently low that said compound is rendered metabolically low caloric or non-caloric, or a physiologically acceptable ester thereof or a metabolic precursor thereof.

2. A method according to Claim 1 wherein said compound has from 6 to about 30 carbon atoms and from 0 to about 10 unsaturations.

3. A method according to Claim 1 wherein said compound has at least one unsaturation that is a double bond.

4. A method according to Claim 1 wherein said compound is an ester of a polyhydric alcohol.

5. A method according to Claim 1 wherein said compound has the formula:



wherein said metabolic blocker renders the yield energy from beta-oxidation of said compound sufficiently low that said compound is rendered metabolically low caloric or non-caloric and wherein A is alkyl of 1 to about 30 carbon atoms, substituted alkyl of 1 to about 30 carbon atoms, alkene of 2 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or substituted alkene

having from 2 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or alkyne having from 2 to about 30 carbon atoms, or substituted alkyne having 2 to about 30 carbon atoms and having from 1 to about 10  
5 unsaturations, or a physiologically acceptable ester thereof or a metabolic precursor thereof.

6. A method according to Claim 5 wherein said metabolic blocker has the formula:

10 -C(X) (D) -,

wherein X is alkyl of 1 to about 10 carbon atoms and D is hydrogen or alkyl of 1 to about 10 carbon atoms and wherein, when D is hydrogen, said metabolic blocker is predominantly an S-enantiomer or is an S-enantiomer  
15 substantially free from R-enantiomer and wherein A is alkyl of 1 to about 30 carbon atoms, substituted alkyl of 1 to about 30 carbon atoms, alkene of 2 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or substituted alkene having from 2 to  
20 about 30 carbon atoms and having from 1 to about 10 unsaturations.

7. A method according to Claim 6 wherein X is methyl and D is hydrogen.

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8. A method according to Claim 6 wherein X is methyl and D is methyl.

9. A method according to Claim 5 wherein said  
30 metabolic blocker has the formula:

- (CH<sub>2</sub> (CH<sub>2</sub>)<sub>a</sub> CH (Y) (CH<sub>2</sub> (CH<sub>2</sub>)<sub>b</sub> CH (Y))<sub>m</sub> (CH<sub>2</sub> (CH<sub>2</sub>)<sub>c</sub> CH (V) -

wherein m is 0 to 3 and wherein V and Y are independently alkyl having from 1 to about 10 carbon atoms and

(i) wherein when the carbon atom comprising the V group is predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer, the carbon atoms comprising the Y groups are independently R-enantiomers substantially free from S-enantiomers or S-enantiomers substantially free from R-enantiomers or one or more of the carbon atoms comprising the Y groups may be a combination of S-enantiomers and R-enantiomers (thereby rendering the fatty acid compound wholly or partially racemic with respect to such carbon atom(s)) and a, b and c are independently an integer of 1 to 5 or

(ii) wherein, when the carbon atom comprising the V group is predominantly an R-enantiomer or is an R-enantiomer substantially free from S-enantiomer and one of the carbon atoms comprising the Y groups is predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer and the other carbon atoms comprising the Y-groups are independently R-enantiomers substantially free from S-enantiomers or S-enantiomers substantially free from R-enantiomers or one or more of the carbon atoms after (with respect to right to left in the above formula) the carbon atom that is the S-enantiomer may be a combination of S-enantiomers and R-enantiomers (thereby rendering the fatty acid compound wholly or partially racemic with respect to such carbon atom(s)) and a, b and c are independently an integer of 1 to 5 and the b or c before the carbon atom that is the S-enantiomer is an integer of 1 or 3 or

(iii) wherein, when the carbon atom comprising the V group is predominantly an R-enantiomer or is an R-enantiomer substantially free from S-enantiomer and the carbon atoms comprising the Y-groups are independently  
5 predominantly an R-enantiomer or are R-enantiomers substantially free from S-enantiomers, at least one of a, b and c is an integer of 1 or 3 and the others are an integer of 1 to 5 and wherein the carbon atoms not comprising the V group or the Y groups may be  
10 substituted with one or more substituents and wherein A is alkyl of 1 to about 20 carbon atoms, substituted alkyl of 1 to about 20 carbon atoms, alkene of 2 to about 20 carbon atoms and having from 1 to about 5 unsaturations, or substituted alkene having from 2 to  
15 about 20 carbon atoms and having from 1 to about 5 unsaturations.

10. A method according to Claim 9 wherein V is methyl and Y is methyl.

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11. A method according to Claim 5 wherein A is selected from the group consisting of  $C_nH_{2n+1}$ ,  $C_nH_{2n-1}$ ,  $C_nH_{2n-3}$ , and  $C_nH_{2n-5}$  wherein n is 4 to 20 and wherein 1 to 5 carbon atoms are optionally substituted.

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12. A method according to Claim 5 wherein said compound is an ester of a polyhydric alcohol.

13. A method according to Claim 5 wherein said  
30 compound is an ester of a triglyceride.

14. A method according to Claim 1 wherein said compound comprises about 1% to about 100% of said edible fat.

5        15. A method according to Claim 1 wherein said food composition comprises a protein or a carbohydrate or both.

10       16. A method according to Claim 1 wherein said compound is a fatty acid substantially incapable of beta-oxidation, or a physiologically acceptable ester thereof or a metabolic precursor thereof.

15       17. A method according to Claim 1 wherein said compound is a fatty acid having a yield energy from beta-oxidation that is low enough to render said fatty acid metabolically low caloric, or a physiologically acceptable ester thereof or a metabolic precursor thereof.

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18. A method according to Claim 1 wherein said compound is selected from the group consisting of R,R,S-pristanic acid, R,R,R-pristanic acid, R,R,R-phytanic acid, R,R,S-phytanic acid, R,R,R-phytol and R,R,S-phytol  
25 and physiologically acceptable esters thereof.

19. A method for rendering an organic acid compound metabolically low caloric or non-caloric said method comprising introducing into said compound one or  
30 more substituents at a carbon atom that is alpha to a carboxyl group of said organic acid compound wherein said substituent renders the yield energy from beta-oxidation of said organic acid compound sufficiently low

that said compound is rendered metabolically low caloric or non-caloric.

20. A method according to Claim 19 wherein said  
5 organic acid compound has from 4 to about 30 carbon atoms and from 0 to about 10 unsaturations.

21. A method according to Claim 19 wherein one  
substituent is introduced and wherein said substituent  
10 is alkyl of 1 to about 10 carbon atoms and said fatty acid compound is predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer.

22. A method according to Claim 19 wherein two  
15 substituents are introduced and wherein said substituents are independently alkyl of 1 to about 10 carbon atoms.

23. A method according to Claim 19 wherein said  
20 substituent is methyl.

24. A method according to Claim 19 wherein said fatty acid compound has the formula selected from the group consisting of  $C_nH_{2n+1}COOH$ ,  $C_nH_{2n-1}COOH$ ,  $C_nH_{2n-3}COOH$  and  
25  $C_nH_{2n-5}COOH$  wherein n is 5 to 20 and wherein 1 to 5 carbon atoms are optionally substituted.

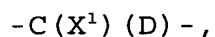
25. A compound of the formula:



30 wherein said metabolic blocker renders said compound substantially incapable of beta-oxidation and wherein A' is alkyl of about 4 to about 30 carbon atoms, substituted alkyl of 1 to about 30 carbon atoms, alkene

of about 4 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or substituted alkene having from about 4 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or alkyne having from 2 to about 30 carbon atoms, or substituted alkyne having 2 to about 30 carbon atoms and having from 1 to about 10 unsaturations, or a physiologically acceptable ester thereof or a metabolic precursor thereof.

10           26. A compound according to Claim 25 wherein said metabolic blocker has the formula:



wherein  $X^1$  is alkyl of 1 to about 10 carbon atoms and D is hydrogen or alkyl of 1 to about 10 carbon atoms and  
15           wherein, when D is hydrogen, said metabolic blocker is predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer and wherein A' is alkyl of about 4 to about 20 carbon atoms, substituted alkyl of about 4 to about 20 carbon atoms, alkene of  
20           about 4 to about 20 carbon atoms and having from 1 to about 5 unsaturations, or substituted alkene having from about 4 to about 20 carbon atoms and having from 1 to about 5 unsaturations.

25           27. A compound according to Claim 25 wherein A' is selected from the group consisting of  $C_nH_{2n+1}$ ,  $C_nH_{2n-1}$ ,  $C_nH_{2n-3}$ , and  $C_nH_{2n-5}$  wherein n is 4 to 20 and wherein 1 to 5 carbon atoms are optionally substituted.

30           28. A compound according to Claim 25 which is an ester of a triglyceride.

29. A food composition comprising an edible fat and a compound according to Claim 25.

30. A food composition comprising a non-fat  
5 ingredient and a fat ingredient at least a portion of which is a compound according to Claim 25.

31. A food composition according to Claim 30 wherein said fat ingredient comprises about 1% to about  
10 100% of said compound.

32. A food composition according to Claim 30 wherein said non-fat ingredient comprises a protein or a carbohydrate or both.  
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33. A compound according to Claim 25 wherein said metabolic blocker has the formula:  
- (CH<sub>2</sub>(CH<sub>2</sub>)<sub>a</sub>CH(Y) (CH<sub>2</sub>(CH<sub>2</sub>)<sub>b</sub>CH(Y))<sub>m</sub>(CH<sub>2</sub>(CH<sub>2</sub>)<sub>c</sub>CH (V) -  
wherein m is 0 to 3 and wherein V and Y are  
20 independently alkyl having from 1 to about 10 carbon atoms and

(i) wherein when the carbon atom comprising the V group is predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer, the carbon atoms  
25 comprising the Y groups are independently R-enantiomers substantially free from S-enantiomers or S-enantiomers substantially free from R-enantiomers or one or more of the carbon atoms comprising the Y groups may be a combination of S-enantiomers and R-enantiomers (thereby  
30 rendering the fatty acid compound wholly or partially racemic with respect to such carbon atom(s)) and a, b and c are independently an integer of 1 to 5 or

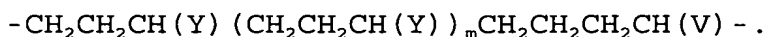


(ii) wherein, when the carbon atom comprising the V group is predominantly an R-enantiomer or is an R-enantiomer substantially free from S-enantiomer and one of the carbon atoms comprising the Y groups is  
5 predominantly an S-enantiomer or is an S-enantiomer substantially free from R-enantiomer and the other carbon atoms comprising the Y-groups are independently R-enantiomers substantially free from S-enantiomers or S-enantiomers substantially free from R-enantiomers or  
10 one or more of the carbon atoms after (with respect to right to left in the above formula) the carbon atom that is the S-enantiomer may be a combination of S-enantiomers and R-enantiomers (thereby rendering the fatty acid compound wholly or partially racemic with  
15 respect to such carbon atom(s)) and a, b and c are independently an integer of 1 to 5 and the b or c before the carbon atom that is the S-enantiomer is an integer of 1 or 3 or

(iii) wherein, when the carbon atom comprising the V  
20 group is predominantly an R-enantiomer or is an R-enantiomer substantially free from S-enantiomer and the carbon atoms comprising the Y-groups are independently predominantly an R-enantiomer or are R-enantiomers substantially free from S-enantiomers, at least one of  
25 a, b or c is an integer of 1 or 3 and the others are an integer of 1 to 5 and wherein the carbon atoms not comprising the V group or the Y groups may be substituted with one or more substituents and  
wherein A' is alkyl of 1 to about 20 carbon atoms,  
30 substituted alkyl of 1 to about 20 carbon atoms, alkene of 2 to about 20 carbon atoms and having from 1 to about 5 unsaturations, or substituted alkene having from 2 to

about 20 carbon atoms and having from 1 to about 5 unsaturations.

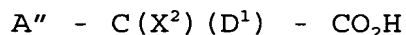
34. A compound according to Claim 33 wherein the  
5 metabolic blocker has the formula:



35. A compound according to Claim 33 wherein the  
metabolic blocker has the formula:  
10  $-\text{CH}_2\text{CH}_2\text{CH}(\text{Y}) (\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}(\text{Y}))_m \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}(\text{V}) - .$

36. A compound according to Claim 33 which is a  
physiologically acceptable ester of a compound selected  
from the group consisting of R,R,S-pristanic acid,  
15 R,R,R-pristanic acid, R,R,R-phytanic acid, R,R,S-  
phytanic acid, R,R,R-phytol and R,R,S-phytol.

37. A compound of the formula:



20 wherein  $\text{X}^2$  is alkyl of 1 to about 10 carbon atoms and  $\text{D}^1$   
is alkyl of 1 to about 10 carbon atoms and wherein  $\text{A}''$  is  
alkyl of about 4 to about 30 carbon atoms, substituted  
alkyl of 4 to about 30 carbon atoms, alkene of about 4  
to about 30 carbon atoms and having from 1 to about 10  
25 unsaturations, or substituted alkene having from about 4  
to about 30 carbon atoms and having from 1 to about 10  
unsaturations, or alkyne having from 4 to about 30  
carbon atoms, or substituted alkyne having 4 to about 30  
carbon atoms and having from 1 to about 10  
30 unsaturations, or a physiologically acceptable ester  
thereof or a metabolic precursor thereof.

38. A compound according to Claim 37 wherein A" is alkyl of about 4 to about 20 carbon atoms, substituted alkyl of about 4 to about 20 carbon atoms, alkene of about 4 to about 20 carbon atoms and having from 1 to about 5 unsaturations, or substituted alkene having from about 4 to about 20 carbon atoms and having from 1 to about 5 unsaturations.

39. A compound according to Claim 37 wherein A" is selected from the group consisting of  $C_nH_{2n+1}$ ,  $C_nH_{2n-1}$ ,  $C_nH_{2n-3}$ , and  $C_nH_{2n-5}$  wherein n is 4 to 20 and wherein 1 to 5 carbon atoms are optionally substituted.

40. A compound according to Claim 37 wherein said compound is an ester of a triglyceride.

41. A food composition comprising an edible fat and a compound according to Claim 37.

42. A food composition comprising a non-fat ingredient and a fat ingredient at least a portion of which is a compound according to Claim 37.

43. A food composition according to Claim 42 wherein said fat ingredient comprises about 1% to about 100% of said compound.

44. A food composition according to Claim 43 wherein said non-fat ingredient comprises a protein or a carbohydrate or both.

45. A physiologically acceptable ester of a compound, which is a fatty acid whose yield energy from

beta-oxidation is sufficiently low that said compound is rendered metabolically low caloric or non-caloric.

46. A compound according to Claim 45 having from 4  
5 to about 30 carbon atoms and from 0 to about 10  
unsaturations.

47. A compound according to Claim 45, which has at  
least one unsaturation that is a double bond.  
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48. A compound according to Claim 45 wherein said  
ester is an ester of a polyhydric alcohol.